Factsheet

Aerated Pond

العربية (/ar/sanitation-systems/sanitation-technologies/aerated-pond)

Applicable to

System 1 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-1%3A-single-pit-system)
System 6 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-6%3A-blackwater-treatment-system-with-infiltration)
System 7 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-7%3A-blackwater-treatment-system-with-effluent-transport)
System 8 (/humanitarian-crises/urban-settings/sanitation/sanitation-systems/system-8%3A-blackwater-transport-to-%28semi-%29-centralized-treatment-system)
System 9 (/sanitation-systems/sanitation-systems/system-9%3A-

Application level

- [x] City
- [ ] Household
- [x] Neighborhood

Management level

- [ ] Household
- [x] Public
- [x] Shared

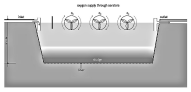
Inputs

Blackwater, Brownwater, Greywater, Effluent

Outputs

Sludge, Effluent

sewerage-system-with-urine-diversion)



Author/Compiled by
Eawag (Swiss Federal Institute of Aquatic Science and Technology)
Dorothee Spuhler (seecon international gmbh)

Adapted from

Compendium of Sanitation Systems and Technologies. 2nd Revised Edition (/node/5587)

Executive Summary

An aerated pond is a large, mixed aerobic reactor. Mechanical aerators provide oxygen and keep the aerobic organisms suspended and mixed with water to achieve a high rate of organic degradation.

Advantages

- Resistant to organic and hydraulic shock loads
- High reduction of BOD and pathogens
- No real problems with insects or odours if designed and maintained correctly

Disadvantages

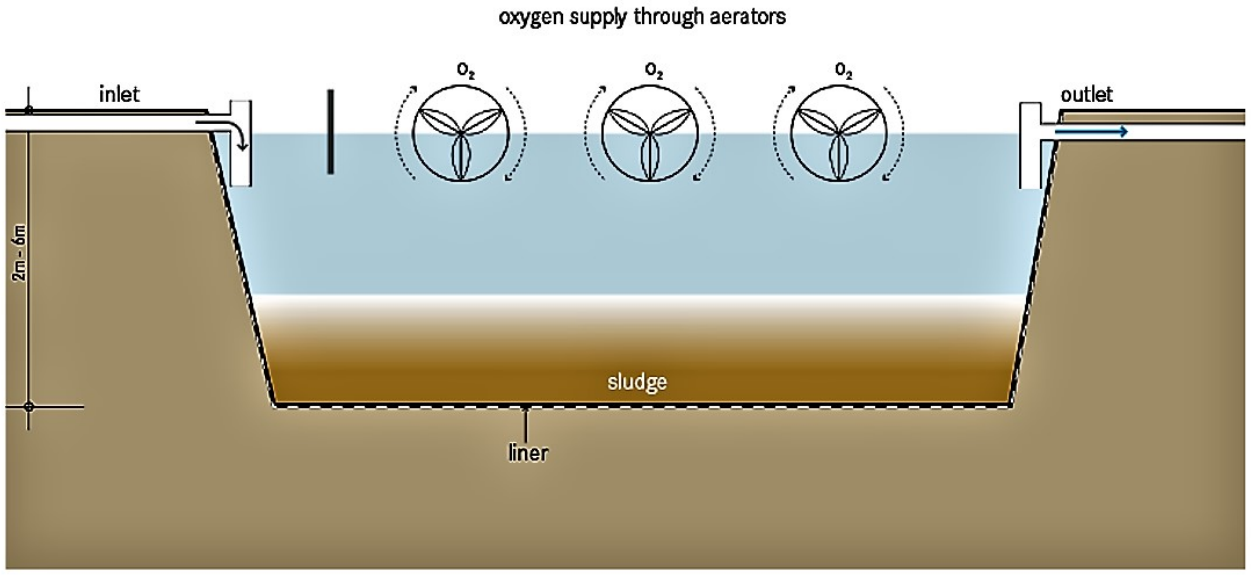
- Requires a large land area
- High energy consumption, a constant source of electricity is required
- High capital and operating costs depending on the price of land and of electricity
- Requires operation and maintenance by skilled personnel
- Not all parts and materials may be locally available
- Requires expert design and construction [no-ecompendium] supervision [/no-ecompendium]
- Sludge and possibly effluent require further treatment and/or appropriate discharge

In	Out
Blackwater, Faecal Sludge, Greywater, Brownwater, Faeces, Excreta	Sludge, Fertigation Water, Biogas (if anaerobic pond is covered)

Introduction

Increased mixing and aeration from the mechanical units means that the ponds can be deeper and tolerate much higher organic loads than a maturation pond (see **waste stabilisation ponds (/factsheet/waste-stabilisation-ponds)**). The increased aeration allows for increased degradation and increased pathogen removal. As well, because oxygen is

introduced by the mechanical units and not by light-driven photosynthesis, the ponds can function in more northern climates.



Schematic view of an artificially aerated facultative lagoon (partially mixed). Source: TILLEY et al. (2014)

Design Considerations

Influent should be screened and **pre-treated (/factsheet/pre-treatment-technologies)** to remove garbage and coarse particles that could interfere with the aerators. Because the aeration units mix the pond, a **subsequent settling tank (/factsheet/thickening-ponds)** is required to separate the effluent from the solids.

The pond should be built to a depth of 2 to 5 m and should have a detention time of 3 to 20 days, depending on the treatment target.

To prevent leaching, the pond should have a liner. This can be made from clay, asphalt, compacted earth, or any other impervious material. A protective berm should be built around the pond, using the fill that is excavated, to protect it from runoff and erosion.

Health Aspects/Acceptance

The pond is a large expanse of pathogenic wastewater; care must be taken to ensure that no one comes in contact with or goes into the water. The aeration units can be dangerous to humans and animals. Fences, signage, or other measures should be taken to prevent entry into the area.

Operation and Maintenance

Permanent, skilled staff is required to maintain and repair aeration machinery and the pond must be desludged every 2 to 5 years.

Care should be taken to ensure that the pond is not used as a garbage dump, especially considering the damage that could result to the aeration equipment.

Applicability

A mechanically aerated pond can efficiently handle concentrated influent and significantly reduce pathogen levels. It is especially important that electricity service is uninterrupted and that replacement parts are available to prevent extended downtimes that may cause the pond to turn anaerobic.

Aerated ponds can be used in both rural and peri-urban environments. They are most appropriate for regions with large areas of inexpensive land located away from homes and businesses. Aerated lagoons can function in a larger range of climates than **Waste Stabilization Ponds (/factsheet/waste-stabilisation-ponds)** and the area requirement is smaller compared to a maturation pond.

Library References

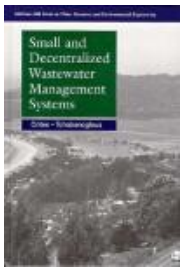
Notes in the Design and Operation of Waste Stabilization Ponds in Warm Climates of Developing Countries

Anaerobic, facultative and maturation ponds as wells as aerated lagoon systems are presented as an appropriate solution in developing countries where sewerage systems are present. The technical content was reviewed by Prof. Duncan Mara (University of Leeds, England). Detailed design, operation and maintenance guidance is given. Hence, this paper can be useful as a technical manual.

(/sites/default/files/reference_attachments/Notes%20in%20the%20Design%20and%20Operation%20of%20Waste%20Stabilization%20Ponds%20in%20Warm%20Climates%20of%20Developing%20Countries.pdf)

ARTHUR, J.P. (1983): Notes in the Design and Operation of Waste Stabilization Ponds in Warm Climates of Developing Countries . (= World Bank Technical Paper , 7). Washington: The World Bank **URL (http://documents.worldbank.org/curated/en/941141468764431814/pdf/multi0page.pdf)** [accessed: 08.25.2018] **PDF (/sites/default/files/reference_attachments/Notes%20in%20the%20Design%20and%20Operation%20of%20Waste%20Stabilization%20Ponds%20in%20Warm%20Climates%20of%20Developing%20Countries.pdf)**

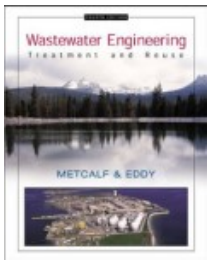
Small and Decentralized Wastewater Management Systems



Decentralised wastewater management presents a comprehensive approach to the design of both conventional and innovative systems for the treatment and disposal of wastewater or the reuse of treaded effluent. Smaller treatment plants, which are the concern of most new engineers, are the primary focus of this book.

CRITES, R. TCHOBANOGLOUS, G. (1998): Small and Decentralized Wastewater Management Systems. New York: The McGraw-Hill Companies Inc

Wastewater Engineering, Treatment and Reuse



TCHOBANOGLOUS, G. BURTON, F. L. STENSEL, H. D. METCALF & EDDY Inc. (2003): Wastewater Engineering, Treatment and Reuse. (= Fourth Edition). New York: McGraw-Hill Companies, Inc.